Development of an Early Warning System for Cross-Border Sewage Flows in the Tijuana River Valley

WQCC, State Board

10/26/2017

OUTLINE

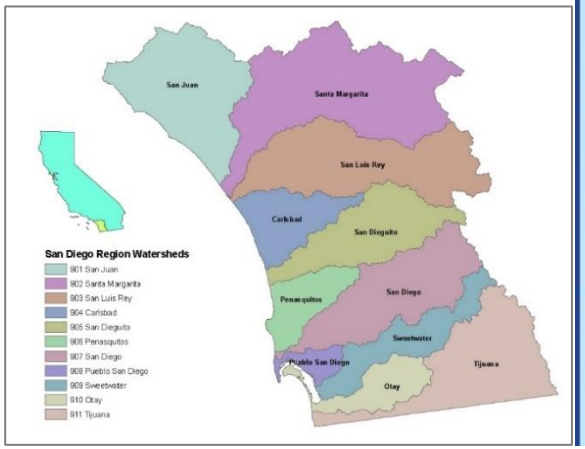
- BACKGROUND
  - *Tijuana River Watershed*
  - *Cross-Border Sewage Spills*
- STUDY OBJECTIVE – *"Why"*
- METHOD AND ANALYSIS – *"What" and "How"*
- RESULTS AND CONCLUSIONS
  - *Method Comparison*
  - *Trouble Shooting*
- PATH FORWARD

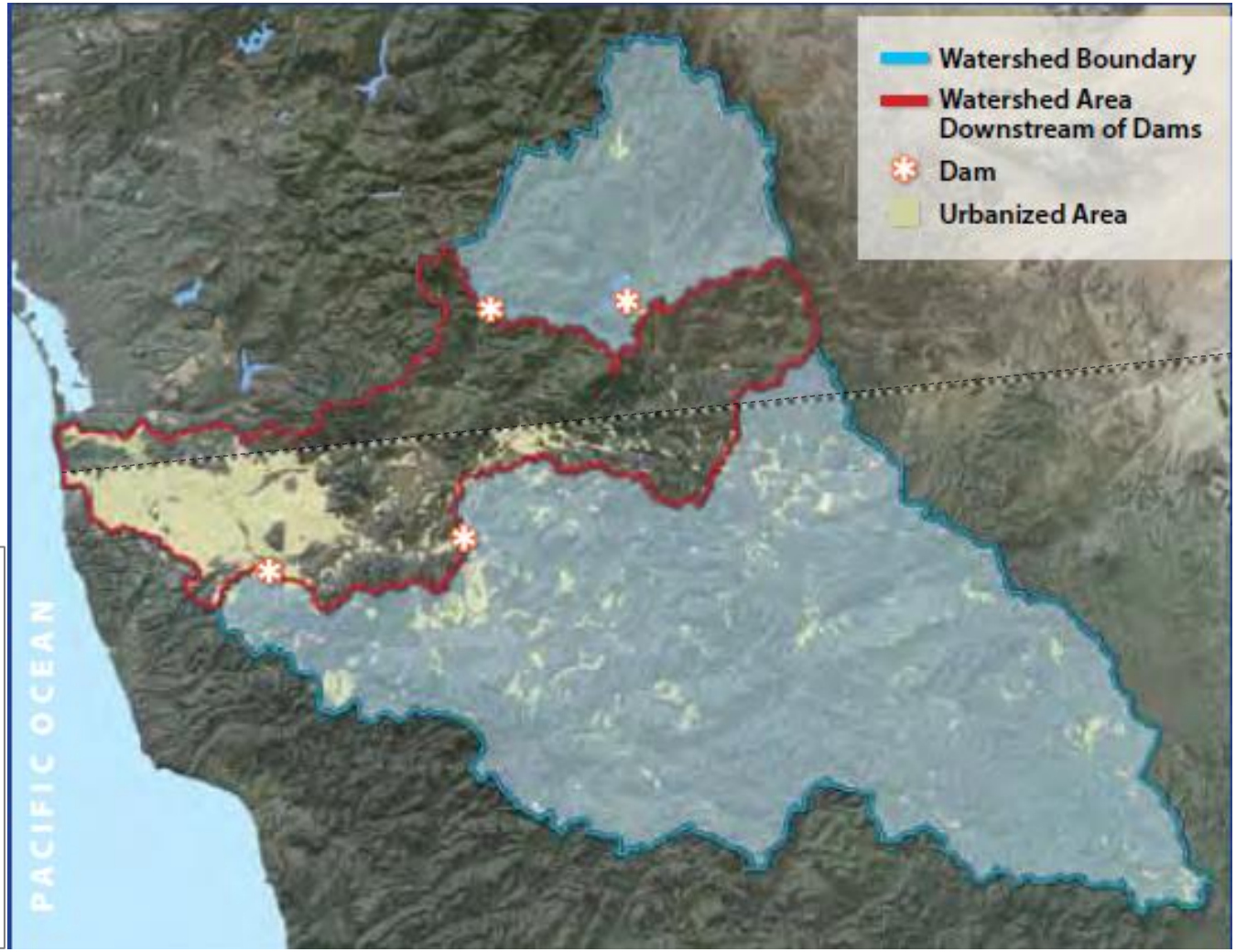
Background – Tijuana River Watershed

Tijuana River Watershed Statistics	U.S.	Mexico
Population within Watershed*	83,000	2.7M
Watershed Area	468 mi^2	1,256 mi^2

*2013 data

- About 1,700-square mile area in total
- Highly urbanized downstream of the dams in Mexico





River Mouth — *Mountain*

Salt Marsh — Riparian Habitat — Pine Forrest

Background – TJ River Watershed

- Diverse Habitats

Cross Border Sewage Spills

- Negative impacts on water quality, human and wildlife health, “REC-1”, and economy
- Increasing frequency and magnitude of spills
- Decreasing timely notice from Mexico


Feb. 24, 2017, Tijuana River Estuary


Mar. 1, 2017, Tijuana River Estuary

Feb. 14,2017, Hotel del Coronado

The Need:

In-situ Sampling and Analysis Device that can serve as Early Warning System for cross-border sewage spills

Desired Features:

- Control/activate sampling activities remotely
- Analyze for Fecal Indicator Bacteria (FIB) *in-situ*
- Provide reliable analytical results fast
- Provide public access to results timely

Desired Features:

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- ✓ **Analyze for Fecal Indicator Bacteria (FIB) *in-situ***
- ? **Provide reliable analytical results fast**
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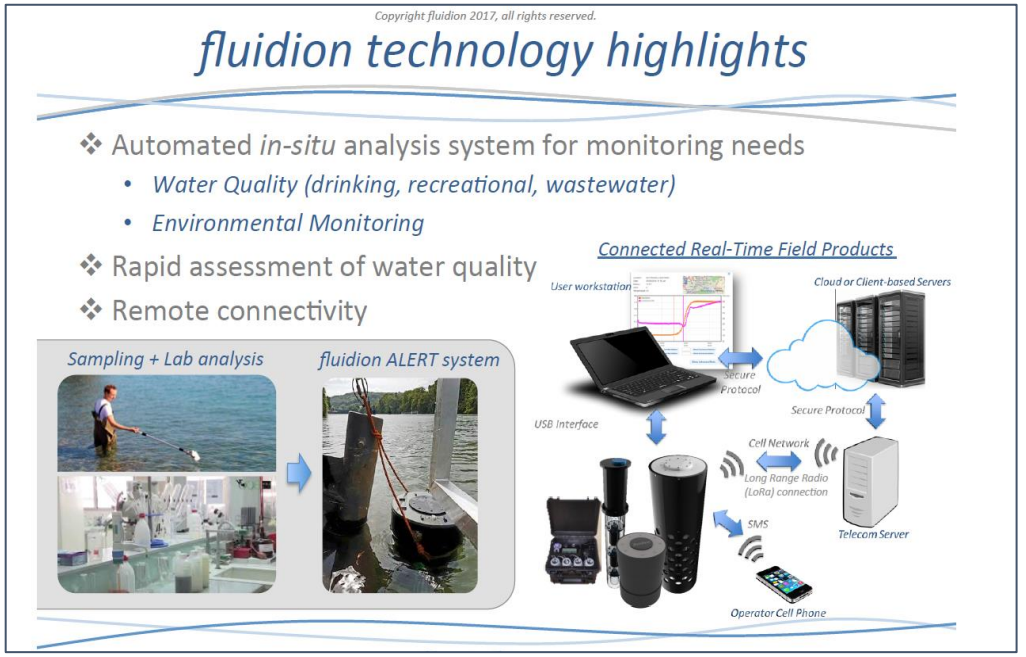
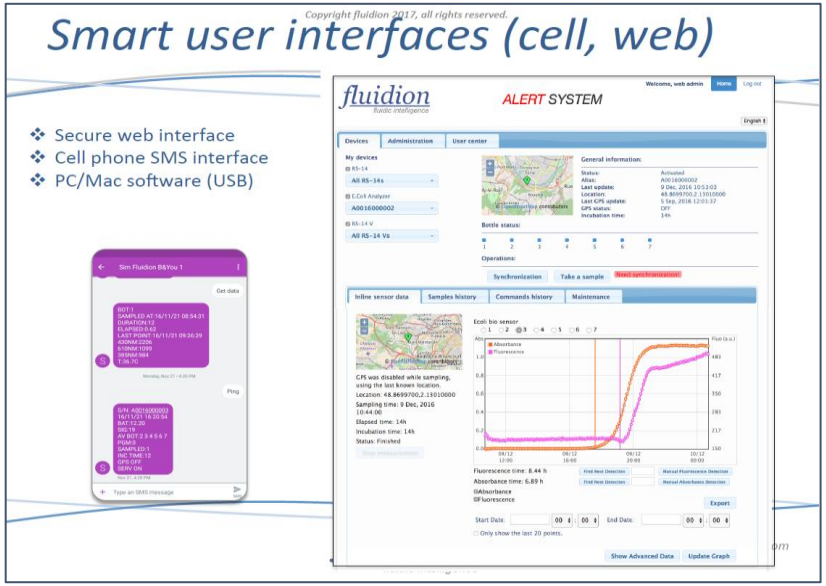




Method Validation Study:

- Parallel Fluidion/ALERT sampling with grab water sampling
- Analyze grab samples in lab with US EPA approved method – Colilert-18® for recreation water
- Compare ALERT results with Colilert results

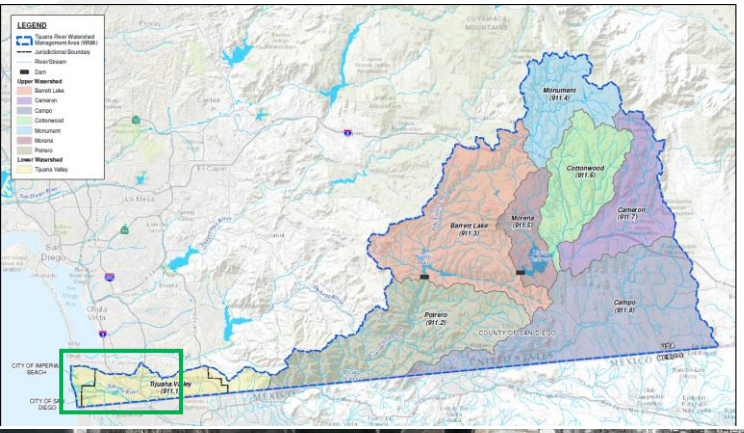
Compare Results

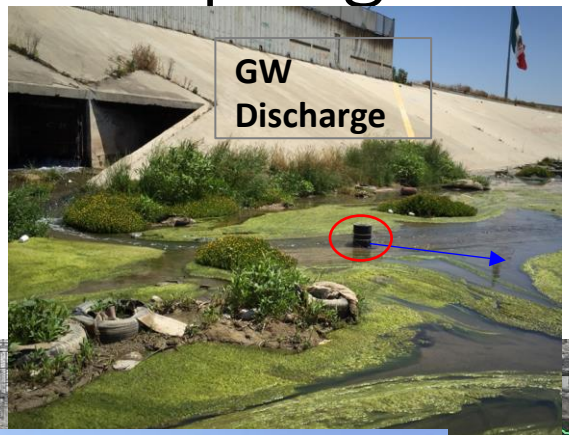
Similar Reagents

[*E.coli*] determined by response time to detect fluorescence above baseline

[*E.coli*] determined by numbers fluorescence wells

Sampling at Tijuana River

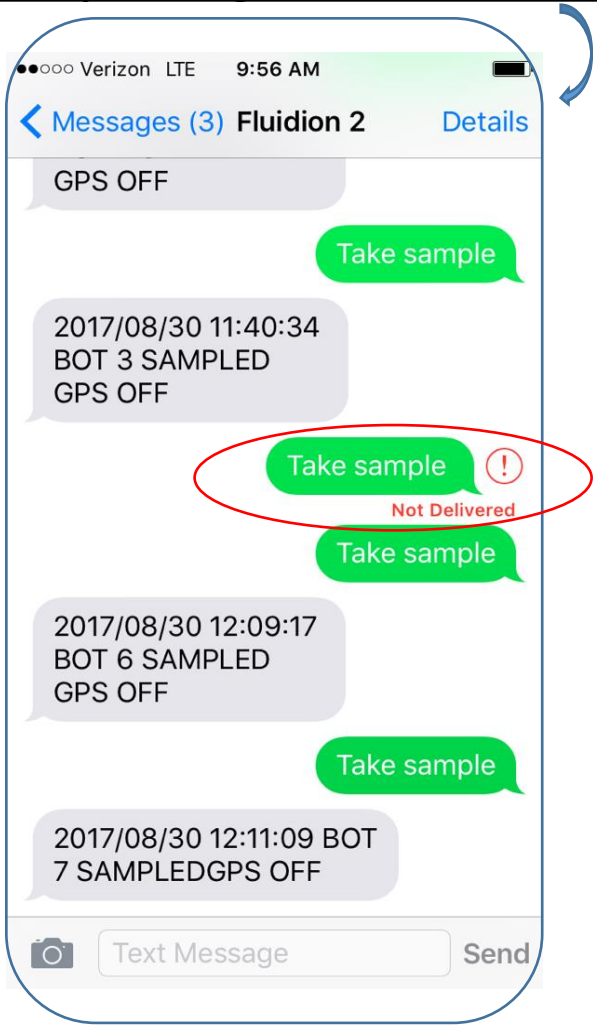




Bacteria Sampling - Tijuana River, 2017

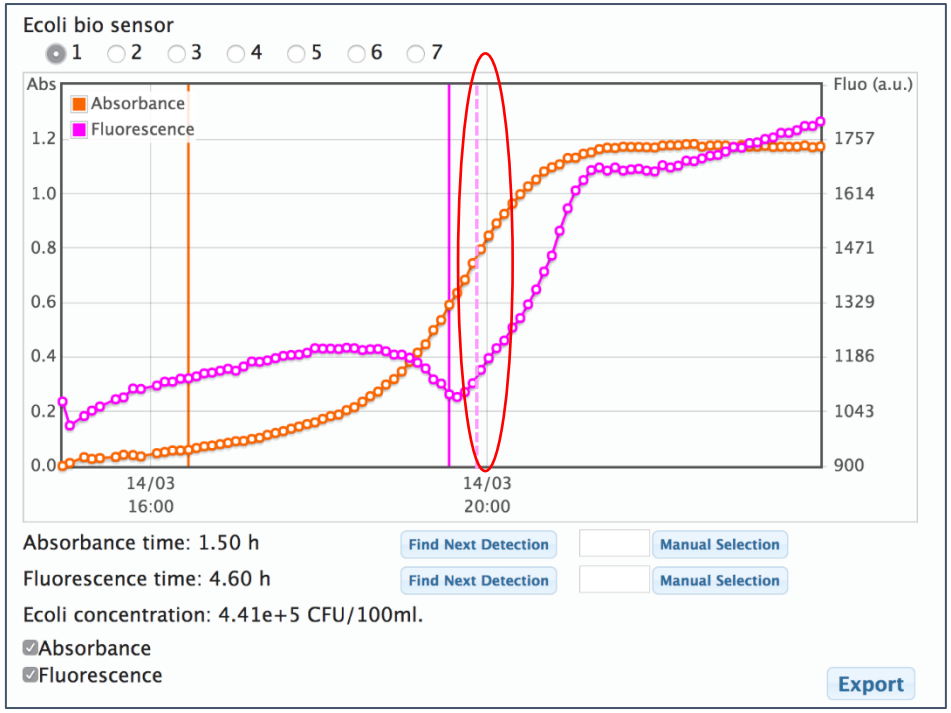
Troubleshooting

No cell phone signal-> can't take sample ☹



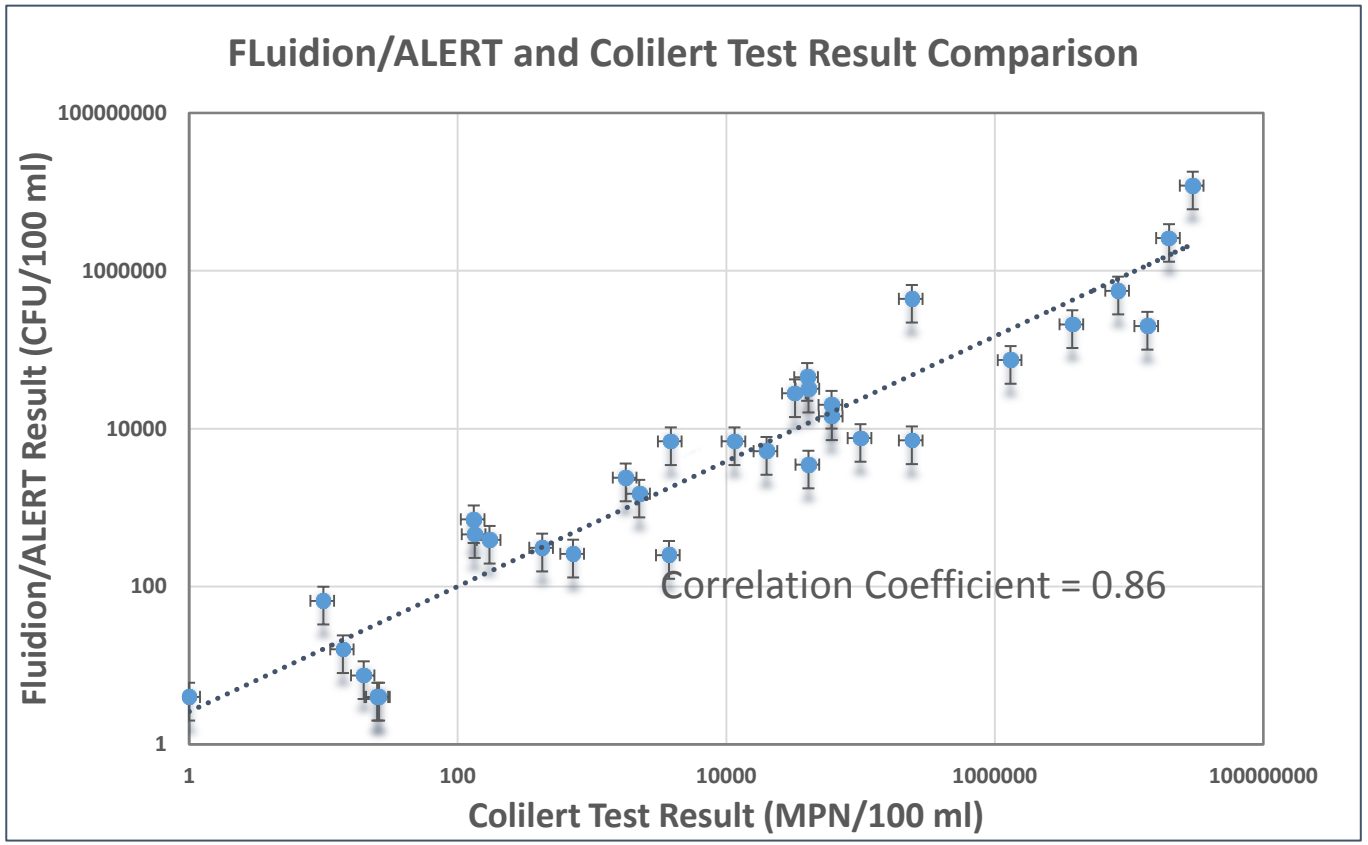
Clogged Sampling Port -> No Sample Taken ☹

Detection line slipped -> algorithm problem?



Results of Method Comparison

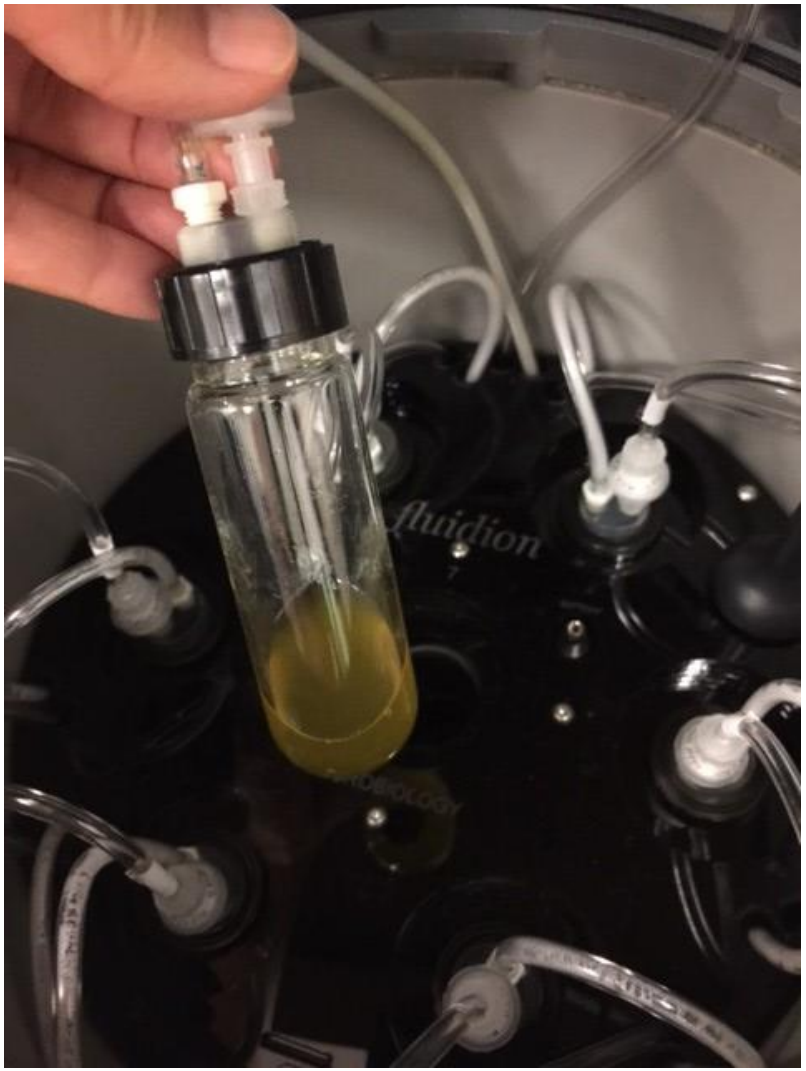
- **Excellent Comparison** with data from Colilert-18® method over 8 LOG units
- **Fast Response** of 4 to 5 hrs for [*E.coli*] of 10^6-10^7 MPN/100ml



Next Steps

- Require (Discharger) to install, operate, and maintain *in-situ* sampling and analysis device(s) that may provide early warnings to nearby communities of cross border flows
- Additional testing of the ALERT system in storm events
- Beta testing of portable version of ALERT (ALERT-lab) in fresh waters of San Diego Region
- Fluidion will apply for US EPA approval of ALERT system as Alternative Method for *E. coli (*and Total Coliform) Analysis

Additional Slide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